

REMARKS

The drawings have been objected to under 37 C.F.R. §1.83(a), the Examiner stating that certain features of claim 16 are not shown in the drawings. Since claim 16 has been cancelled from the present application, it is believed that this objection has been eliminated.

Claims 1-16 have been rejected by the Examiner under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. As the Examiner will note, the relevant claims have been amended to eliminate the objection raised by the Examiner, and accordingly it is believed that this rejection has been eliminated.

Claim 16 has been rejected has been rejected by the Examiner under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Since claim 16 has been cancelled from the present application, it is believed that this rejection has been eliminated.

Claims 1-16 have been rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over FR 2,794,825 to Mougey. This rejection is respectfully traversed.

The present invention is directed to a method for determining wear of composite material brake disks, including the steps of determining an instantaneous wear contribution of the brake disks during deceleration on the basis of the value of the energy dissipated by the brake disks during deceleration and on the basis of the determined, estimation temperature of the brake disks during deceleration.

The wear of composite material brake disks had been found to be dependent both on the energy dissipated by the brake disk and on the operating temperature of the brake disk, that is, on the way in which energy is dissipated. In other words, the same amount of dissipated energy produces a different amount of wear on the braking

area depending on whether it is dissipated during extreme use of a vehicle (typically on-track use) in which the brake disks reach high temperatures of over 400-500 °C, or during normal use (typically use on public highways). More specifically, the same amount of dissipated energy produces much greater wear of the braking area during extreme use as opposed to normal use of the vehicle.

Claim 1, as amended, relates to a method of determining the wear of composite material brake disks. On the other hand, the Mougey reference relates to a method of determining wear of brake linings and does not contain any suggestion of the possibility of using the present method for determining the wear of brake disks. The wear of composite material brake disks is completely different from the wear of a brake lining. A composite material brake disk has a non-linear wear in which the disk does not have a significant loss of mass (less than 2%) and the disk specific loss of mass and the disk maintains a standard efficiency until the braking moment at which the disk is suddenly destroyed. On the contrary, a brake lining has a linear wear scenario in which the lining loses its mass progressively and thus reduces progressively in its efficiency.

The wear of composite material brake disks has been found to depend both on the energy dissipated by the brake disk and on the operating temperature of the brake disk, that is, on the way in which energy is dissipated. In other words, the same amount of dissipated energy produces a different amount of wear on the braking area depending on whether it is dissipated during extreme (typically on-track) use of the vehicle in which the brake disks reach high temperatures or during normal use (typically on public highways). More specifically, the same amount of dissipated energy produces much greater wear of the braking area during extreme use as opposed to normal use of the vehicle.

Amended claim 1 recites, in addition to other features, the determination of the instantaneous wear contribution of the brake disk during deceleration on the basis of the value of the energy dissipated by the brake disks during deceleration on the basis

of the determined estimation temperature of brake disk during deceleration. The estimation the temperature of the brake disk during deceleration is determined as a function of the mean value of a kinetic energy differential within a given time interval. Claim 1 has been amended to recite this feature.

The Mougey reference discloses the determination of an instantaneous wear contribution of a brake lining during deceleration on the basis of the value of the energy dissipated by the brake lining during deceleration and on the basis of the temperature of the lining at the beginning of the deceleration (and thus not during the deceleration). Equations 11 and 12 of the Mougey reference defines the incremental wear which a brake pad (brake lining) undergoes during a braking event as a function of the temperature T_0 of the brake pad before (and not during) the braking event. Furthermore, the temperature T_0 of the brake pad before the braking event is estimated in a very complicated manner, which requires the knowledge of many parameters (see for reference Equations 3, 4 and 5). The Mougey reference does not disclose or suggest the concept of determining an instantaneous wear contribution on the basis of the value of the energy dissipated during deceleration and on the basis of the determined estimation temperature of the brake disks during deceleration. Furthermore, the Mougey reference does not disclose the step of determining an estimation of the temperature of the brake disks during deceleration as a function of the mean value of the kinetic energy differential within a given time interval.

In order to reach the invention as defined by claim 1 of the present application, the Examiner would have to completely disregard the teachings of the Mougey reference where the temperature of the brake pad before the braking event is estimated by using complicated equations. Thus, to reject the claims over the Mougey reference, it is necessary for the Examiner to completely reconstruct the teachings of the Mougey reference in view of the Applicants' own disclosure. It is settled patent law that to establish a prima facie case of obviousness, all of the claim limitations must be taught or suggested in the prior art. It is the Applicants position that the Examiner

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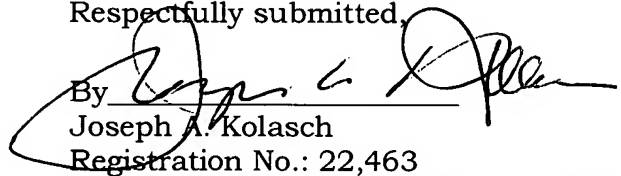
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has failed to meet this burden and thus has failed to establish a prima facie case of obviousness.

Accordingly, in the view of the above amendments and remarks reconsideration of the rejection and allowance of all the claims of the present application are respectfully requested.

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Respectfully submitted,

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Attachments